REMARKS

By the present amendment, claims 1, 5, and 23 have been amended to more clearly set forth Applicant's invention. Claims 32-41, being subject to a final restriction requirement, are cancelled pending the filing of a divisional application. The claims now pending in this application are claims 1-31.

Restriction Requirement

In the prior Office Action of September 15, 2005, the Examiner required restriction between claims 1-31 (Invention I) drawn to a process of making low MW, granular polytetrafluoroethylene or modified polytetrafluoroethylene in a suspension polymerization, classified in Class 525, subclass 199 and claims 32-41 (Invention II) drawn to low molecular weight polytetrafluoroethylene or modified polytetrafluoroethylene having the claimed properties as specified, classified in Class 525, subclass 250. Applicant elected for prosecution with traverse claims 1-31. The Examiner has now made the restriction requirement final. Claims 32-41, being withdrawn from consideration and subject to a final restriction requirement, are cancelled pending the filing of a divisional application.

Objection to the Specification

The Examiner objected to the Specification on page 1, line 30 and maybe throughout the specification due to use of the term "fluoro and chlorofluro alkanes" and suggested the use of the term "fluoro- and chlorofluoro-alkanes".

Response to Objection to the Specification

This amendment substitutes a new paragraph including the suggested correction for the paragraph beginning on page 1, line 19.

Claim Objections

The Examiner objected to claims 1, 5, 23 and 33-34 because of the following informalities:

(a) On **Claim 1** at line 1 and **Claim 32** at line 1, the phase of "**low molecular weight**" should be specified along with a range or a limit. It is noted that the molecular weight of polymers can be as high as several millions. Otherwise, one having ordinary skill in the art may be confused by the real numbers.

(b) On **Claim 33** at line 2 and **Claim 34** at line 2, **each claim dependency** is wrong and needs to be corrected.

Response to Claim Objections

(a) Claim 1 has been amended to insert the words in the second and third lines "said polytetrafluoroethylene or modified polytetrafluoroethylene having a melt viscosity of less than about 1 x 10^6 Pa·S". A polytetrafluoroethylene or modified polytetrafluoroethylene having a melt viscosity of less than about 1 x 10^6 Pa·S is recognized by one skilled in the art as being low molecular weight.

The other claim objections relate to claims which have been cancelled from this application.

Accordingly, the claim objections of the Examiner have been overcome.

Claim Rejections – 35 USC § 112

Claim 5 and 23 are rejected under 35 U.S.C., second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

On **Claim 5** at line 2 and **Claim 23** at line 3 , the word "**essentially**" and "**substantially**" renders the claim **indefinite** because it is **unclear** whether the limitation(s) following the phrase are part of the claimed invention. The word such as "**essentially**" or "**substantially**" is relative terminology. In is not clear which range controls the actual metes and bound of the claimed subject matter. See MPEP § 2173.05(b).

Response to Claim Rejections – 35 USC § 112

Claim 5 has been amended to delete the wording "essentially free of surfactant" and to provide that the contents of the reaction vessel "comprises surfactant in an amount less than 0.010% based on the amount of water present". The specification on page 8, lines 30-33, defines the meaning of "essentially free of surfactant" as being an amount of surfactant less than 0.010% based on the amount of water present, providing clear support for the amendment.

In Claim 23, the word "substantially" has been deleted.

Applicant submits that the rejection of claims 2 and 23 under 35 U.S.C., second paragraph, have been overcome.

Claim Rejections – 35 USC § 102

The Examiner rejected Claims 1-9 and 12-31 under 35 U.S.C. 102(b) as being anticipated by Kurihara et al. (US 5,461,129) with evidence of Fritschel (US 4,487,902) or Bannai et al. (US 4,580,981).

Regarding Claim 1, the Examiner asserts that Kurihara et al. discloses an "**aqueous**" "**suspension polymerization process**" (see aqueous at column 2, line 39; see suspension polymerization at column 1, lines 40 and 49) to prepare various modified PTFE copolymers from TFE and PAVE in the presence of **methanol**; such obtained copolymer would carry a specific melt viscosity of **30×10^4 to 200×10^4 poise at 372°C** which is overlapping with the claimed melt viscosity (column 1, line 38-58; column 2, line 4-6; also see melt viscosity at Table 2 at column 4; particularly see methanol at column 2, line 36-45). The Examiner notes that the step of agitating to coagulate the polymer is a very common procedure in making fluoropolymers (see "902" at column 4, line 49-50). With respect to "**the use of methanol to be functional as telogen**", the Examiner asserts that **each of Fritschel and Bannai** has disclosed that methanol is very useful as a telogen agent in the course of copolymerization process in making PTFE fluoropolymers (citing "902" at column 4, line 43-50 for telogen and agitating step; citing "981" at column 4, line 23-27). Therefore, the Examiner concludes that Kurihara anticipate the limitation of parent Claim 1.

Regarding **Claims 2-4**, the Examiner asserts that the step of agitating to **effectively** coagulate the polymer is a very common procedure in the making fluoropolymers as disclosed by Fritschel at column 4, line 49-50 (also see working examples in the involving references).

Regarding **Claim 5**, the Examiner asserts that **surfactant** is not used in Examples 1-4 as well as comparative Example 1 (column 2, line 35 – column 3, line 7).

Regarding **Claims 6-7**, the Examiner asserts that the content of reactor clearly has a polymer solid level overlapping with the claimed numbers of Claims 6-7 (see 168.1 g of purified copolymer was isolated on column 2, line 35-67). The Examiner notes the crude polymer in the reactor would be higher than 168.1 g.

Regarding **Claim 8**, the Examiner asserts that no light irradiation is used in working examples at all.

Regarding **Claims 9 and 12-14**, the Examiner asserts that **methanol is not a fluorinated organic compound**. However, the Examiner says amount of telogen may be varied and is not critical according to the references (citing "129" at column 2, line 41; citing "902" at column 4, line 43-44).

Regarding **Claim 15-16**, the Examiner asserts that **grinding** the granular polymer into a powdery product is a common procedure in making fluoropolymers.

Regarding **Claims 17-29**, the Examiner asserts that the issue of inherent property can be applied according to the MPEP with respect to **specific surface area, weight average particle size, extractable fluoride level, and also the polydispersity.**

Regarding **Claims 30 and 31** for use such obtained copolymers as **an additive agent to ink or plastic compositions**, the Examiner refers to the disclosure at "902" on column 4, line 66-68; see "129" on column 1, line 25-28; also see "981" on column 8, line 6-9.

Response to Claim Rejections – 35 USC § 102

Applicant respectfully traverses the rejection of amended claim 1 as being anticipated by Kurihara et al.

Applicant's amended claim 1 is directed to a process for producing low molecular weight, granular polytetrafluoroethylene or modified polytetrafluoroethylene having a melt viscosity of less than about 1×10^6 Pa·S in a suspension polymerization process. As discussed above, the stated melt viscosity range for polytetrafluoroethylene or modified tetrafluoroethylene clarifies what is meant by low molecular weight.

Applicant's process comprises polymerizing pressurized tetrafluoroethylene in an agitated reaction vessel which contains aqueous medium, free radical initiator, and a telogen. The contents of the reaction vessel are agitated during polymerization sufficiently to coagulate polytetrafluoroethylene or modified polytetrafluoroethylene. Granular polytetrafluoroethylene or modified polytetrafluoroethylene having a melt viscosity of less than about 1×10^6 Pa·S is isolated directly from said reaction vessel. Claim 1 has been further amended to clarify that, if modified, the polytetrafluoroethylene has about 0.002 to about 0.20 mole% of comonomer.

As discussed in Applicant's specification, prior art processes for directly polymerizing low molecular weight polytetrafluoroethylene (PTFE) powders have employed emulsion polymerization. These processes employ typically employ expensive fluorosurfactants which fluoropolymer manufacturers typically capture for destruction or recycle, further increasing costs. In addition, the resulting particles typically are friable and have high surface areas which are not suitable for certain end uses such as coatings and printing inks. It has been attempted to decrease the surface area of such powders by heating followed by comminuting but such processes are inherently difficult or impossible to control.

When prior art suspension polymerization processes are used, the resulting polymer must be subjected to thermal degradation or irradiation to reduce molecular weight. However, these process steps are expensive and generate hazardous by-products such as hydrogen fluoride.

Applicant's process directly polymerizes by suspension polymerization a low molecular weight PTFE or modified PTFE which has a desirable surface area and which can be easily increased to a desired by grinding. The molecular weight (as indicated by the claimed melt viscosity range) is in the range desired and is obtained directly from polymerization vessel. No subsequent degradation steps are required.

Kurihara et al., on the other hand, is directed to making an entirely different kind of polymer, i.e., a melt-fabricable polytetrafluoroethylene-perfluorovinyl ether copolymer in which the comonomer is a particular vinyl ether, perfluoro(ethyl vinyl ether). The Kurihara et al. process makes a polymer which contains 1% to 10% by weight of perfluoro(ethyl vinyl ether) and the patent teaches molding uses, in particular, molding into sheets or films which have good resistance to flex fatigue.

Kurihara et al. cannot be read to disclose making a low molecular weight granular polytetrafluoroethylene or modified polytetrafluoroethylene useful as an additive in powder form to other materials such as inks, coatings, greases, lubricants, and plastics. Firstly, no PTFE homopolymers of any kind are disclosed in Kurihara et al. Moreover, no modified PTFE polymers are disclosed. Modified PTFE called for Applicant's amended claim 1 contains only a small amount of comonomer and is distinctly different from the melt-fabricable polytetrafluoroethylene-perfluorovinyl ether copolymer suitable for use a molding resin. Applicant has amended claim 1 to clarify that the comonomer in modified PTFE is present in an amount of about 0.002 to about 0.20 mole%.

Thus, the low molecular weight granular PTFE or modified PTFE made in the process of amended claim 1 is not disclosed in Kurihara et al. Accordingly, the process of amended claim 1 is not anticipated by Kurihara et al. and the rejection of amended claim 1 should be withdrawn.

Contrary to the position of the Examiner, Fritschel or Bannai et al. provide no evidence in support of a rejection under 35 USC 102 based on Kurihara et al. Fritschel discloses a melt-fabricable copolymer of 93-99 mol % tetrafluoroethylene and 7-1 mol % fluorinated alkyl comonomer useful for making molded articles such as films. Again, this is a melt-fabricable molding resin and no low molecular weight PTFE or modified PTFE polymers are disclosed. Bannai et al. discloses a soft and rubbery polymer for dental plates polymer of a fluorine-containing "monomer" with a molecular weight of 300 to 1600 made by telomerization in an alcohol of no less than 50% vinylidene fluoride and another fluorinated monomer and subsequent reaction with acryloyl chloride or methacryloyl chloride. Bannai et al. clearly fails to anything concerning low molecular weight granular PTFE or modified PTFE polymers.

Claims 2-9 and 12-31 were also rejected under 35 U.S.C. 102. Claims 2-9 and 12-31 are directly or indirectly dependent upon amended claim 1. Therefore, claims 2-9 and 12-31 are novel for at least the same reasons described above that amended claim 1 is novel. Moreover, claims 2-9 and 12-31 are directly to preferred forms of the invention and contain additional features which are not disclosed Kurihara et al.

Accordingly, the rejection of claims 1-9 and 12-31 under 35 U.S.C. 102 should be withdrawn.

Claim Rejections – 35 USC § 103

The Examiner rejected Claims 10-11 under 35 U.S.C. 103(a) as being unpatentable over Kurihara et al. (US 5,461,129) in view of Fritschel (US 4,487,902).

The Examiner began explaining the basis for this rejection by saying that the 102(b) rejection of over Kurihara set forth above for Claims 1-9 and 12-31 is incorporated here by reference. Regarding the limitations of dependent Claims 10-11, the Examiner asserts that the Kurhara reference is **silent about using aliphatic hydrocarbons containing C1-6 to be useful as a telogen**. The Examiner further asserts that **Fritschel** teaches that in the making modified PTFE fluoropolymers, **alcohol such as methanol as well as low MW alkane such as ethane can be very useful as a telogen**. Therefore, the Examiner concludes that Fritschel has clearly taught that functional equivalence and interchangeability are existed between such two types of telogen in making PTFE fluoropolymers (see telogen at column 4, line 43-50; see PTFE copolymers at column 2, line 58-68).

In light of the fact that both of the involved references are dealing with the preparation of modified PTFE polymeric in the presence of a telogen, the Examiner further concludes that one having ordinary skill in the art would therefore have found it obvious to modify Kurihara's polymerization process by **replacing methanol with a low MW alkane such as ethane** as taught by Fritschel. By doing so, the Examiner says that one would expect all the embodiments (such as alcohol and alkane) in the same genus (telogen) would succeed based on functional equivalence and interchangeability. Additionally, the Examiner explains that such a replacement may immediately reduce the toxicity from using methanol.

Response to Claim Rejections – 35 USC § 103

As discussed above, neither Kurihara et al. nor Fritschel disclose a process for producing low molecular weight PTFE or modified PTFE. Both disclose making melt-fabricable copolymers and nothing is taught about low molecular weight PTFE or modified PTFE. With respect to the claim 10 and 11 which the Examiner has rejected based on the combination of these references, Applicant submits that the combination of Kurihara et al. and Fritschel do not teach or suggest the claimed subject matter. These references teach the use of a telogen but only for use in the manufacturer of a melt-fabricable copolymer molding resin which contains a high percentage of fluorinated comonomer, i.e., 1 mol% or more. It is common to use a telogen in the polymerization of melt-fabricable copolymer molding resin but telogen is not employed in significant amount in suspension polymerizations to make high molecular weight granular PTFE polymers. Thus, neither reference even remotely suggests anything to one of ordinary skill in the art concerning the use of a telogen, let alone the compounds set forth in claims 10 and 11, in a process for the suspension polymerization to produce a low molecular weight, granular PTFE or modified PTFE.

Accordingly, Applicant submits that the rejection of claim 10 and 11 under 35 U.S.C. 103 should be withdrawn.

A Petition for a three-month extension of time to respond is submitted herewith.

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

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